

**WALKER CREEK WATERSHED
BEST MANAGEMENT PRACTICES (BMP) EVALUATION
FOR THE IRRIGATED LANDS REGULATORY PROGRAM
PERFORMED UNDER CONTRACT 05-182-150 BETWEEN THE COUNTY OF GLENN
DEPARTMENT OF AGRICULTURE AND THE CENTRAL VALLEY REGIONAL
WATER QUALITY CONTROL BOARD**



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**Prepared by Glenn County Department of Agriculture
May 2008**

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BACKGROUND

The Central Valley Regional Water Quality Control Board has adopted a Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Resolutions No. R5-2003-015 & R5-2006-0053) herein referred to as the Irrigated Lands Regulatory Program (ILRP). In an effort to integrate resources, a Memorandum of Understanding (MOU) between the California Department of Pesticide Regulation, the Agricultural Commissioners of Butte and Glenn County, the Central Valley Regional Water Quality Control Board (Regional Board), and the State Water Resources Control Board was developed. This MOU applies to a pilot program initiated with Glenn and Butte Counties. These two counties, under the jurisdiction of the Regional Board, may undertake activities throughout the Sacramento River Basin. Subsequent to the MOU, a contract has been entered into between the Regional Board and the Glenn County Agricultural Commissioner (County) to perform tasks requested by the Regional Board specific to the MOU. The resulting contract contained five tasks for the County to perform at the request of the Regional Board.

During the course of the contract period and discussions with the Regional Board contract manager, a recurring theme was recognized as it related to quantifying monitoring results at selected sampling points of the Sacramento Valley Water Quality Coalition (SVWQC) of agricultural dischargers to waters of the state and management practices employed within those agricultural operations and the direct beneficial effect those practices may have on those results.

In an effort to assist the SVWQC and the Regional Board, County staff suggested that a survey of existing visual management practices in place that may benefit water quality would be performed. In order to make the evaluation comprehensive, the Walker Creek watershed contained within Glenn County would serve the purposes of all concerned. The following concept was developed and presented to the Regional Board contract manager for approval:

Walker Creek BMP Evaluation (Concept)

- 1) Select sub-basin – Walker Creek: Total watershed is contained within Glenn County, all cropping is identified in GIS, pesticide use data readily available.
- 2) Ag Department to provide majority of outreach to growers including NRCS/EQUIP program applicability.

- 3) Collect baseline pesticide information by sampling prior to flood storm season according to established SVWQC protocol and acceptable to the Regional Board.
- 4) Evaluate/Document BMP's in the sub-basin; identify growers, pesticides, additional GPS of fields if necessary; identify BMP's in/out of place (direct drainage etc).
- 5) Assess/evaluate historic pesticide use (prior year).
- 6) Sample during storm season similar to prior sampling event as described in item 3.
- 7) Evaluate difference/similarities based upon results.
- 8) Sample during irrigation season as described in item 3.
- 9) Evaluate results of Sampling.
 - a) If no significant difference, the BMP's in place are working
 - b) If different, identify BMP's not in place that would help, provide additional outreach
 - assess/document additional BMP's put into place
 - follow up sampling required ??

After discussion with the Regional Board contract manager the following work plan was developed and presented to the Regional Board contract manager for approval:

Walker Creek Watershed BMP Documentation Work Plan:

BACKGROUND

As a component of the Irrigated Lands Regulatory Program (ILRP) MOU and the companion contract between the Regional Water Quality Control Board (Regional Board) and the Glenn County Department of Agriculture (County), the County proposes to document the management practices utilized in agricultural operations within the Walker Creek Watershed that may have water quality improvement and protection benefits.

The Walker Creek Watershed encompasses over 27,000 acres. Within that acreage there are approximately 140 growers identified that grow a variety of crops, similar to other diversified crop areas in the county. Regional Board staff has recently collected and analyzed baseline water samples from the newly established Sacramento Valley Water Quality Coalition location at the south end of Walker Creek. This baseline information will be used as a comparison for future sampling events.

PURPOSE:

Glenn County staff shall perform the following activities in the Walker Creek Watershed for the Regional Board in support of the MOU for the purposes of verifying the effectiveness of identified practices and their contribution towards surface water quality protection and also for identifying sources that may contribute to exceedances of established water quality parameters.

Tasks:

1. Provide growers a Farm Site Self-Assessment survey developed by CURES. Compile the completed assessment forms and summarize the findings and forward those findings to the Regional Board staff. (Based upon survey review it was decided they would best be used by the local sub-watershed for individual outreach)

Estimated completion in June 2007.

2. Document management practices for each agricultural operation. Additional watershed characteristics such as locations of discharge points directly into waterways, locations of significant structures (levees, dams, weirs), and non agricultural parcels in the County database will be incorporated into previously supplied ARC View maps.

Estimated completion in December 2007.

3. Assess management practices within the watershed in conjunction with readily available pesticide use information in the event there are exceedances from pesticides and/or nutrients, sediment, or other constituents of concern due to agricultural operation activities.

This task will be ongoing as sample results indicate necessary follow up.

4. Provide outreach as needed relating to water quality and also supply information to growers of additional management practices that may be needed to improve water quality. Assist in the development of supplementary outreach newsletters on local water quality issues. Also, inform growers of the water quality benefits that can be realized through participation in EQIP programs with the NRCS.

This task will be ongoing.

5. Assist Regional Board staff by providing information and input from the evaluation that will further the implementation of the ILP.

This task will be ongoing.

6. Provide the Regional Board staff with reports on evaluation progress reports quarterly or as requested.

This task will be ongoing.

METHODS

County staff began the Best Management Practices (BMP) evaluation by utilizing a portion of the map previously developed for Task 1 of the contract. Walker Creek (Attachment A) is a Cal Fed recognized watershed totally contained within Glenn County. Staff had access to all available information such as parcel number, property owner or operator, agricultural production and cropping, and pesticide use reports. The watershed was completely contained within the county borders and therefore would be more manageable and staff also possesses a one-on-one relationship with most agricultural operators.

Once the Walker Creek watershed was selected for the evaluation, an overlay of the fields database from AgGIS (the pesticide permitting program utilized in Glenn County) was used to determine which growers were located within the borders of the watershed. It was decided that fields having their centers in the boundary were to be included in the evaluation. After selecting those fields, an attribute table containing the permit number and site number was exported into a spreadsheet. The list had to be cross-referenced with the AgGIS program to add the growers' names and contact information to the spreadsheet individually. This was used to formulate a mailing list and also for a field/grower list to help determine how many acres would be surveyed and how many growers would be contacted. This was not helpful for use in the final database of growers because as sites change hands, this particular list became outdated.

A Field Survey Sheet was developed to take into the field (Attachment B). The survey needed to include management practices and other relevant information. To make the survey sheet, staff first had to determine what identified BMPs to use. The Coalition for Urban and Rural Environmental Stewardship (CURES) pamphlets and the CURES Agricultural Practices Report were consulted and served as a foundation for the survey sheet. Practices were chosen on the basis that a surveyor could visually observe the practice while driving around the field perimeter. Pesticide mix and load sites were also included because some sites are fairly permanent and can easily be seen.

In addition to deciding what practices to use, staff also determined how to group the information. It was decided to use groups of crop types, such as field crops or orchards instead of each individual crop. Irrigation methods could also be grouped. Decisions were also made to determine what types of cover crops and buffers should be included. More in depth answers to unobserved practices employed on each site would be disclosed in a Farm Site Self Assessment survey (developed by CURES, Attachment C) which was mailed to each identified property operator in the watershed. The survey response represents 60% of the fields in the visual survey.

Outreach to growers in this evaluation was recognized as a very important component. Growers within the watershed were mailed a letter explaining the BMP watershed evaluation along with the survey. It was explained that visual surveys were being conducted and that they would be asked to fill the accompanying survey and more may

be asked of them as the evaluation continues. At this point the survey is only being used as a backup to the field survey and focused outreach if necessary by the local Subwatershed group.

The majority of the staff's time was spent conducting the field surveys and developing the database and mapping program that incorporated the aspects of the evaluation. The surveys were conducted from February 2007 and concluded in October 2007 by driving around all sides of each site when possible. Staff used the ArcMap of the watershed and the fields database from AgGIS to determine which fields should be surveyed. If the field was at least halfway in the watershed, a survey was conducted. Through trial and error, staff decided that it was not practical to conduct surveys for one grower at a time because their sites were not always near each other. Instead a map was printed for a large block of fields to complete sections of the watershed at one time regardless of grower. Then smaller maps showing the location of each field and the nearest roads were made to assist in the field survey. The maps were used to draw in major drainages, public waterways, BMPs employed, and other relevant information during the survey. The maps are kept along with the paper copy of the field survey and are used for backup information (Maps and survey sheets are not included in this report but all are available upon request).

There was a wide range of practices observed and it was noted that all surveys should be conducted within a shorter period of time for consistency. Seasonal changes may occur and surveys done are only a snapshot in time. Orchards that have vegetation between the rows in the spring may be bare in the fall due to herbicide applications to clean the floor for harvest. The surveys should be conducted after crops are planted and actively growing to be able to see what practices and irrigation methods are used. Crops can change from year to year, so this year's survey will not be as useful for applied pesticides next year, except for permanent crops.

In addition to being consistent with season of survey, the surveyors need to be consistent. All surveyors should be using the same definitions and applications of management practices employed. It is best to have one person train each surveyor so that the surveys are consistent.

Quality Control measures in survey data should also be employed. Some fields are land-locked and cannot be surveyed. Some fields can only be seen from one or two sides. Criteria must be determined for usable or unusable data.

After the survey was conducted, the information was transcribed on a large wall map of the watershed. Each field was outlined as it was completed and a colored sticker was used as a visual cue for crop type. Staff decided that it would also be good to have a visual representation of irrigation type, so fields were outlined in a particular color representing an irrigation type (Map is available upon request).

As the surveys progressed, it became apparent that growers with 10 acres or less would not be surveyed. Most of these sites are ranchette type operations for home use. The

fields were hard to get to and often landlocked making it difficult to survey. This in no way indicates whether or not the owner of the parcel is a member of the coalition.

Staff determined that there was a need to incorporate all the data into a usable format. An access database was created and linked to an ArcMap of the watershed. The map used to obtain the grower contact list was elaborated to include a new layer (Attachment D) for fields surveyed. The map originally included layers for aerial photos, the field database from AgGIS, Glenn County watershed boundaries, streams, parcel information (from 2004), and roads. The Walker Creek watershed boundary was selected from the layer that included all Glenn County watersheds and a new layer was made from that. Walker Creek was selected from the streams layer and a new layer was made for Walker Creek. This would allow staff to run queries with respect to the creek boundary. The AgGIS fields layer did not line up with the aerial photos and therefore the fields had to be drawn in as the surveys progressed. Eventually layers for non-attributes sites (sites for which no pesticide permit information was available) and not surveyed sites were added. Not surveyed sites included landlocked sites and sites that were less than 10 acres. In the attribute table, the reason the site was not surveyed was noted. A layer with the sample location was also incorporated into the map. Additionally, an organic fields layer was also added. This layer had already been developed for other purposes within the office, but was used to help fill in gaps for fields that did not have a pesticide permit. This layer overlaps with the field survey in some instances in which the organic grower does have an operator ID. Surveys were not conducted on organic sites that did not have operator IDs.

The information from the completed surveys was entered into the database and drawn onto the map immediately, making it easy to find fields that were missed and identifying gaps in the information gathered. The map serves a good visual representation of the work done.

One of the largest obstacles with the mapping is that the layers come from many sources and are not all in the same projection. The layers do not match up and leaves room for error. Because of the mismatch, it is possible that some fields included in the survey are really not in the watershed and some fields that should have been included may have been missed. It is important that all layer projections are the same.

The access database was created to incorporate all aspects of the field survey into a useable format. The database was then joined to the ArcMap of the watershed so that a person can click on a site and pull up the field survey data, the grower information, and the site information. It also allows more in depth queries to be conducted.

Staff did not have any previous experience in using the access program, so things started with a very basic program. Three tables were made with all the information for Growers, Sites, and Field Survey information. As the program progressed, staff realized that additional fields needed to be added or deleted or joined in another manner. Through trial and error, the program is functional on a table level. As skills improve, it is recommended that a form be made so that duplicate information entered is at a minimum.

Numbers were assigned to specific characteristics from the survey as a way to speed data entry and for consistency, but makes it difficult for someone without familiarity of the program to understand what they are looking at. Assessor Parcel Numbers were originally included in the table for each site, but it was decided that it was better to have a separate layer on the map for parcels than to incorporate it in the table. It was time consuming to cross reference the sites and parcels and individually type in each parcel number. In addition, it was not practical in the sense that some sites are in more than one parcel and some parcels have many sites. Some sites are a small portion of several parcel numbers. It was more practical to have a separate layer on the map in which a person can click on the area to determine the parcel number(s) for any site in question. Furthermore, parcel numbers are listed by owner and the database is set up based on grower/operators. Growers are more relevant for the BMP evaluation because they are typically responsible for management activities performed on the land. It is sufficient to have the parcel layer on the map to easily determine the owner of the land.

The next task was to mesh the two programs. Staff exported database tables to a file and then imported that file into ArcCatalog. From ArcCatalog a join can be made from the file to the map. Click on a site and all relevant information comes up. It is important to remember that each time the database is updated, the files need to be re-exported so that the map contains the most current information.

At this point, significant queries can be run in both ArcMap for a spatial representation or in the Access database for tabular information. Queries can be conducted for irrigation type, crop type, distance from creek, specific crop, specific grower, specific area, or combinations of these or other criteria. Queries can also be conducted in Access and exported and linked to the map for visual representation of the query.

SUMMARY

The Walker Creek watershed was chosen because it is fully contained in Glenn County. Staff has better mapping capabilities for our county. Staff has access to all pesticide use reporting information for our county and has access to the permitting program which in turn can be used to acquire a grower list and contact information. Sampling is conducted near the bottom of the Walker Creek watershed.

This potentially can be a very useful tool, especially for subwatershed groups to be able to conduct outreach efficiently. Outreach can be conducted to specific growers or on a whole watershed level as needed. Subwatersheds can also evaluate BMPs for effectiveness or determine if additional BMPs for specific growers need to be encouraged.

As a component of this BMP evaluation, a pesticide use query was performed in the watershed to coincide with visual inspection of the agricultural discharger parcels. A total of 228,695 pounds of active ingredient of all pesticides and herbicides were applied within the watershed boundaries from September 2006 through September 2007.

Although there were water quality exceedances in the watershed during the study period, when the volume of these exceedances are examined, it is clear that the management practices in place are working to protect water quality.

A watershed BMP evaluation takes a good deal of time to get started, but once the process is set, it moves fairly rapidly. The most time is spent in set up and conducting the field surveys. Time needed to enter the field information and for running a query is minimal. If staff has previous experience and/or formal training with ArcMap and Access, setup time is greatly reduced. Remember, County staff was self taught in Arc View and received some minimal formal training in Access during this whole process.

This type of evaluation is a good way to narrow the focus when dealing with water quality concerns. All land in the watershed drains to one area and has a monitoring point at the end of it. Narrowing the scope for a water quality concern within a watershed is more effective than searching the entire county for a possible cause.

Visual field assessment surveys can be used as a tool for a subwatershed group if water quality standards are not being met. They may use the survey information to help formulate a management plan or to suggest management practices that can be employed that may help alleviate water quality issues.

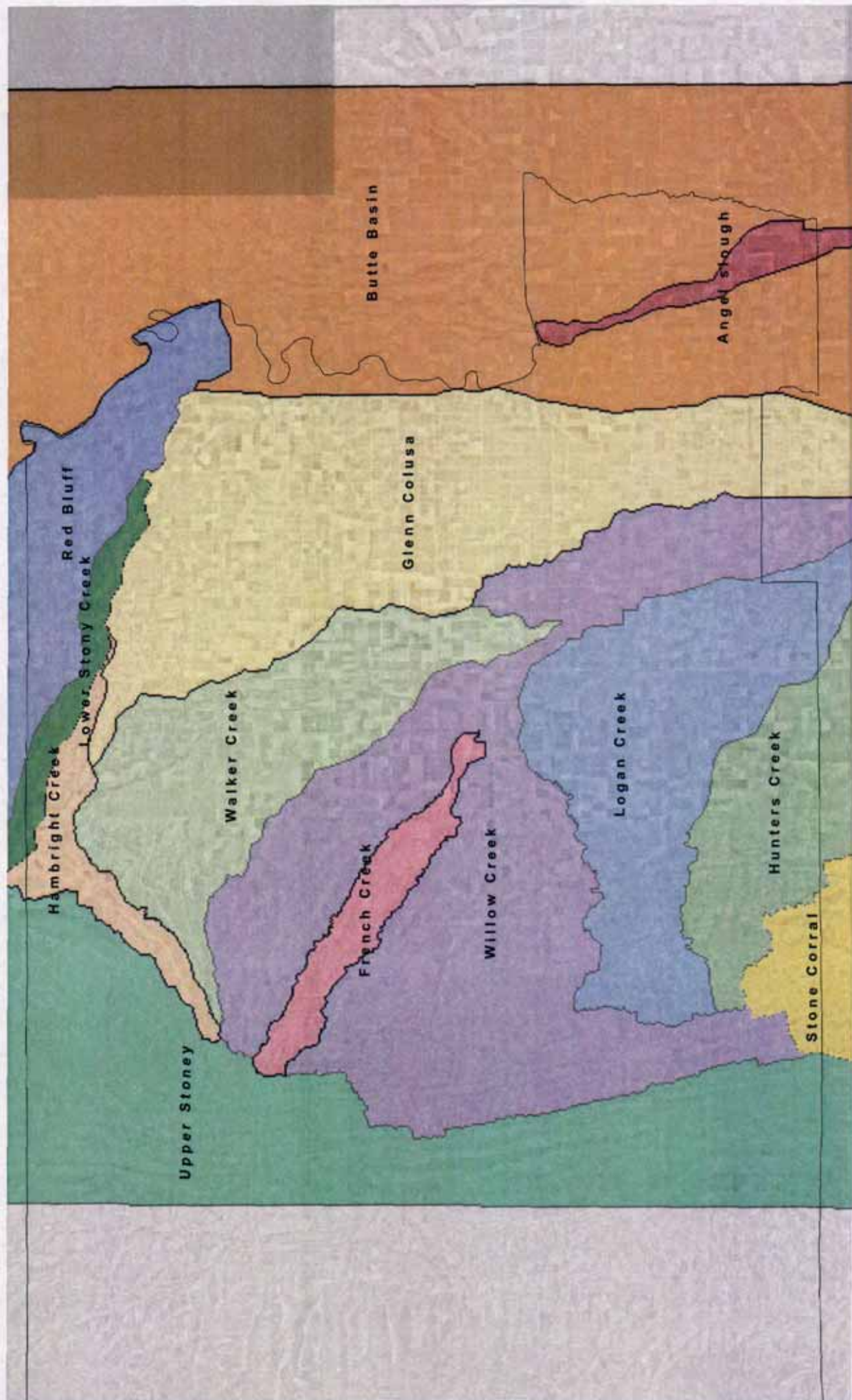
Conducting a watershed evaluation is a more relevant and practical way to determine water quality from a manageable section of land that drains to one area. Because the sampling is conducted near the end of the watershed, it gives good characterization of the watershed. Outreach for water quality concerns can be conducted quickly and more efficiently than on a county wide basis. It is more practical to target a group of growers in an area that drains to one location than it is to target the whole county. The subwatershed coordinators can use the information to conduct outreach on a whole watershed basis or by growers that were likely to contribute to the water quality concern. This is a way to keep the ILRP a non-point source program at the subwatershed level that can provide point-source outreach at a local, non-regulatory level to gain compliance and improve water quality.

NEXT STEPS

As a follow up to the renewed contract with the Regional Board, it is requested that the County evaluate the effectiveness of management practices to protect water quality at Walker Creek by 1 December 2008. A work plan will be developed for approval by the Regional Board contract manager to achieve this performance measure.

ATTACHMENT A

Walker Creek Area Map



This is an aerial photograph of the Walker Creek Watershed, outlined by a red boundary line. The map shows a grid of roads, with labels such as 'Road 1' through 'Road 57' and 'State Hwy 162'. A compass rose is located in the bottom left corner. The watershed area is predominantly agricultural, with some forested areas visible in the upper left. The title 'WALKER CREEK WATERSHED' is printed in large, blue, serif capital letters across the top of the map.

ATTACHMENT B

BMP Field Survey

Walker Creek BMP Field Survey

APN: _____

Grower: _____

Water Source: _____

Site #: _____

Acres: _____

Field Type:	Field Crop	Orchard	Range	Rice	Other:
	Row Crop	Vineyard	Pasture	Uncultivated Ag	

Irrigation System:	Surface	Sprinkler	Microirrigation	None	Other:
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Observed Management Practices:

General

- ☐ Field Properly Graded (Minimal Slope)
- ☐ Proper field sanitation
- ☐ Reduced herbicide treatment to berm areas

Mix & Load

- ☐ Containment pad with sump pump
- ☐ Area can be tilled and changed periodically
- ☐ Buffer from nearest water way. Distance to water =

0--20'	20'--100'	>100'
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Soil Management

- ☐ Tillage

Contour Planting	Ripping	Aeration	Other:
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Vegetation Management

- ☐ Cover crops:

Resident Veg.	Seeded	Annuals	Perennials	Green Manure
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- ☐ Buffers:

Filter Strips	Hedgerowes	Riparian	Vegitated Waterways	Constructed Wetlands
---------------	------------	----------	---------------------	----------------------

Drainage Managemnt System

- | | |
|--|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Berms <input type="checkbox"/> Water & Sediment control basins <input type="checkbox"/> Tailwater recovery <input type="checkbox"/> Vegitated drainage ditches <input type="checkbox"/> Grassy waterways <input type="checkbox"/> Constructed wetlands | <ul style="list-style-type: none"> <input type="checkbox"/> Settling Ponds <input type="checkbox"/> Recirculation system |
|--|--|

Notes: _____

Surveyor: _____

Date: _____

ATTACHMENT C

Farm Site Self Assessment

County of **Glenn** Department of Agriculture

Mark D. Black, Agricultural Commissioner/ Sealer of Weights & Measures

Jean S. Miller, Assistant Agricultural Commissioner/Sealer of Weights & Measures

DATE: November 27, 2006
TO: Glenn County Grower
FROM: Lester Messina
SUBJECT: Watershed Management Practice Evaluation

The Central Valley Regional Water Quality Control Board (Board) has implemented the Irrigated Lands Program (ILP) in response to the conditional waiver for runoff from commercial agricultural properties that use pesticides. By now, everyone is familiar with the Sacramento Valley Water Quality Coalition (Coalition) and the Colusa Glenn Sub-watershed, the local administrative entity for the Coalition that coordinates water quality sampling in Colusa and Glenn Counties or the California Rice Commission Monitoring Program that concentrates their efforts in rice water quality. Sampling results over the past few years have been very favorable, indicating that there may not be as much of an impact from irrigated agriculture as previously thought.

In a related matter, the Board, the State Water Resources Control Board, the Department of Pesticide Regulation, and the Agricultural Commissioners of Glenn and Butte Counties entered into a Memorandum of Understanding (MOU) to create a pilot program to assist the Regional Board, in a non-regulatory manner, with the implementation of the ILP and provide input on agricultural practices within our counties. A work plan was developed from the MOU and the Counties entered into separate contracts with the Regional Board proposing specific tasks to perform and make recommendations or evaluate others. One such task is to document management practices in place used by growers that would have a positive effect on water quality to reduce runoff containing pesticides. Examples of pesticides that affect water quality are organophosphates (Diazinon, Guthion) or pyrethroids (Asana, Lorsban). There are many practices used that growers utilize intentionally and there are also practices that are unknowingly used in day to day operations. The documentation of these practices may be the most effective way of communicating to the Regional Board that pesticides are used in a safe and responsible manner.

In order to achieve this goal, staff from the Glenn County Department of Agriculture will be doing a management practice evaluation in the Walker Creek watershed during 2007. To provide backup to the evaluation, Walker Creek has been added to the Coalition's sampling locations (County Road 48). You are receiving this letter to inform you that your agricultural operation falls within the Walker Creek watershed and we will be contacting you in the near future to discuss the specifics of the evaluation. There may be some additional requests made of you at the time you get your restricted materials permit.

Your cooperation in this evaluation is greatly appreciated. This is an outreach program, and there will be no enforcement actions associated with the evaluation. In the meantime, if you have any questions or comments, please call Lester Messina or Lisa Hunter at (530) 934-6501.

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Phone: (530) 934-6501
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Email: agcommr@countyofglenn.net

FARM SITE SELF-ASSESSMENT

Coalition for Urban/Rural Environmental Stewardship
www.curesworks.org

Grower 1

Acres: _____

FARM SITE SELF-ASSESSMENT

Handling and applying pesticides carries important responsibilities, not only for doing the best job possible to control insects and diseases, but also for limiting the potential for surface water contamination (off site movement). Today, more than ever, public pressure and regulatory scrutiny is increasing on the activities we routinely perform on the farm.

This site assessment is intended to assist growers in identifying practices or site characteristics that may lead to off site movement of farm inputs such as pesticides and nutrients.

The questionnaire is intended only as a CONFIDENTIAL SELF-EVALUATION of your fields and practices.

The authors suggest reviewing this site assessment with a Pest Control Advisor (PCA) or Farm Advisor who is familiar with your farm management and pest control practices.

Coalition for Urban/Rural Environmental Stewardship

Farm Site

1) Have you made a visual evaluation of the surrounding area and fields to assess the runoff potential (from irrigation storm water) of a field prior to a pesticide spray application?

Yes _____
No _____ 1

2) Prior to an application do you check weather conditions and ask questions such as "Is it too windy?" or "Will it rain later today or tomorrow?"

Yes _____
No _____

3) Prior to applying winter dormant sprays, what is the condition of your orchard floor?

Vegetative Cover
Some Vegetation
Vegetated Cover with Sprayed Berms
No vegetation (disked)
No vegetation (not disked)

Acres This Year	Acres Next Year
_____	_____
_____	_____
_____	_____
_____	_____

4) Do you contain runoff from your orchard(s) during winter storms and after dormant sprays, preventing runoff from entering nearby waterways?

Yes _____
No _____
No runoff on property _____

5) What type(s) of practices are used to lessen storm runoff from fields into ditches, canals or streams that flow into nearby rivers.

Vegetative Filter Strips Around Edges
Grass Row Centers
Tailwater Return System
None

Acres This Year	Acres Next Year
_____	_____
_____	_____
_____	_____

6) In the past two years, have you practiced any mitigation measures (checking weather conditions, i.e. avoided spraying on windy days or when rainfall is imminent, checking droplet size/calibrating nozzles, maintaining setback zones) to reduce drift of pesticides to non-target areas?

Yes _____
No _____

7) Have you been informed of methods to reduce the potential of pesticides being carried into ditches, canals or streams that feed into nearby rivers?

Yes _____
No _____

Pest Management

1) Are pesticides used only when insect scouting or PCA indicates they are necessary?

Yes _____
No _____

2) Are populations of pests and beneficials considered when making pest management decisions?

Yes _____
No _____

3) Are economic thresholds (when applicable) considered when making pest management decisions?

Yes _____
No _____

4) Are UCIPM guidelines and/or other IPM information considered when making pest management decisions?

Yes _____
No _____

5) If you have an orchard near a sensitive waterway or with drainage to waterways, have you or your PCA considered alternative strategies to using diazinon or chlorpyrifos (Lorsban) in your spray program either during the dormant or growing season?

Yes _____
No _____

6) Do you normally spot treat pest-infested areas or treat an entire field to prevent further infestation?

Decision based on many variables _____
Spot-treat only _____
Treat whole field always _____

7) Are chemical rotation and insect resistance management considered in the decision to use a pesticide?

Yes _____
No _____

8) Is the most environmentally benign pesticide that is effective against a pest used after considering the factors in question 7?

Yes _____
No _____

9) Is crop rotation used to avoid buildup of pest populations?

Yes _____
No _____

Pesticide Mixing / Loading / Storage

1) What is the surface where pesticide or fertilizer mixing/loading takes place?

Concrete or asphalt pad that drains to a central sump

Concrete or asphalt pad

Field

Soil or gravel

Hard packed or paved road

2) What is the minimum distance between any pesticide or fertilizer mixing/loading area and any ditches, canals or streams that feed into nearby rivers?

Less than 20 feet

Between 20 and 100 feet

More than 100 feet

3) What is the minimum distance between any pesticide or fertilizer mixing/loading area and any deep well locations?

Less than 20 feet

Between 20 and 100 feet

More than 100 feet

4) Is the sprayer checked for cracked or broken hoses and is the drain plug in place prior to filling the tank?

Yes

No

5) Is the tank filled to overflowing?

Yes

No

6) How do you prevent tank overfilling?

Stop when it foams over

Keep a close watch

7) Do you use an airgap between the fill tube and the tank?

Yes

No

8) During mixing and loading how full is the tank prior to the addition of chemicals?

One-third to one-half full

Two-thirds full

Full

Pesticide Mixing / Loading / Storage (continued)

9) Is someone present during pesticide or fertilizer mixing/loading operations to watch for spills and other mishaps and take corrective action?

Present entire time

Present most of the time

Start filling, leave and return after set time

10) Are you and your employees aware of the necessary corrective action when a spill occurs?

Yes

No

11) Do you use a closed system when required?

Yes

No

12) Do your pesticide and fertilizer storage areas have spill containment capability to protect from runoff into any nearby surface waters?

Yes

No

13) What type of floors are in your pesticide and fertilizer storage areas?

Impermeable surface with curbs (coated or sealed concrete is best)

Impermeable surface without curbs, no cracks

Impermeable surface with curbs, some cracks

Permeable surface

Sprayer Equipment and Spraying

1) How often is spray equipment calibrated?

Prior to each application

Once per month

Once per year

Never

2) Are spray nozzles adjusted to match the crop canopy profile?

Yes

No

3) When spraying young orchards, are top nozzles shut off to minimize overspray and conserve materials?

Yes

No

4) Are outside nozzles shut off when spraying outer rows next to sensitive sites?

Yes

No

5) In the past two years, what type of sprayer(s) did you use for orchard or row crop application(s)?

Electronic controlled sprayer nozzles (e.g. Smart Sprayer)

Conventional Airblast

Aerial

6) Are nozzles used that provide the largest effective droplet size in order to minimize drift?

Yes

No

7) How many acres of dormant pesticides are applied with ground equipment?

Acres This
Year

Acres Next
Year

_____|_____

Sprayer Equipment and Spraying (continued)

8) Have you been informed through your PCA, farm input supplier or grower meetings about recent changes in the Diazinon label that no longer allow for aerial applications?

Yes

No

9) How many acres sprayed with dormant pesticides are within 100' upslope of any surfacewater, including ag ditches

Acres This
Year

Acres Next
Year

10) Are the first 3 rows closest to waterbodies sprayed only when wind is blowing away from the waterbodies?

Yes

No

11) Are air blast applications made only when wind is between 3-10 mph as measured with an anemometer on the side nearest and upwind from a sensitive site?

Yes

No

Sprayer Cleanup and Container Disposal

1) How do you dispose of rinsate from your sprayer(s)?

- Mix with water and reapply to field
- Store in hazardous waste container
- In field, not prone to runoff, that can be disked
- In field, more than 150 feet from surface waters
- In field, less than 150 feet from surface waters

2) Where do you clean spray application equipment?

- On a mixing/loading pad
- On application site (rinseate re-applied to field)
- More than 300 feet from surface waters
- More than 150 feet from surface waters
- Less than 150 feet from surface waters

3) How do you handle empty pesticide containers?

- Triple rinsed, taken to landfill or recycling handler
- Triple rinsed, then put on burn pile
- Put on burn pile

4) Do you clean up pesticide and fertilizer spills promptly?

- Yes
- No

Runoff Management

1) Is vegetation planted or allowed to grow in and along drainage ditches to trap sediment?

Yes

No

2) Do you maintain vegetated filter strips at least 10' wide downslope of cropped areas that are adjacent to and within 100' of sensitive aquatic sites?

Yes

No

3) Are orchard dormant applications made when soil moisture is at field capacity and/or when a storm event likely to produce runoff is forecast to occur within 48 hours after application?

Yes

No

4) Are appropriate slopes, tillage, furrow lengths, and irrigation set times used to optimize irrigation efficiency and reduce runoff?

Yes

No

5) Do you use drainage basins (sediment ponds) or wetlands to capture and retain runoff for at least 72 hours?

Yes

No

6) Are tailwater return systems utilized to recirculate and reapply irrigation runoff to other fields?

Yes

No

7) Is Polyacrylamide (PAM) used to increase water infiltration, and reduce furrow erosion and sediment levels in runoff?

Yes

No

8) Are irrigations scheduled according to actual moisture levels or by the calendar?

Yes

No

Nutrient Management

1) Prior to planting are soil samples taken to determine amounts of nutrients currently present in the soil?

Yes _____

No _____

2) Are fertilizer applications based on crop needs and past crop production versus production goals?

Yes _____

No _____

3) Are plant tissue samples taken mid to late season to determine the plant's fertilizer needs?

Yes _____

No _____

4) Is nitrogen supplied in excess of total crop needs?

Yes _____

No _____

5) Are fertilizers placed where maximum plant uptake can occur?

Yes _____

No _____

6) When injecting fertilizer into irrigation water are proper backflow devices installed?

Yes _____

No _____

7) Before application are applicators made aware of any sensitive areas that need to be avoided during application?

Yes _____

No _____

Manure Management

1) Do you currently make applications of manure to your irrigated land?

Yes _____
No _____

2) Who is most responsible for making decisions about the application of manure for your operation? (Please check only one)

Owner _____
Employee _____
Other _____

3) Who actually applies the manure for your operation? (Please check only one)

Owner _____
Employee _____
Contractor _____
Other _____

4) Please check all the manure types that your agricultural operation has applied in the past 5 years.

Dairy _____
Chicken _____
Other _____

5) Please check all the manure types that your agricultural operation will likely apply in the next 5 years.

Dairy _____
Chicken _____
Other _____

6) What is the average rate per acre of manure that you apply annually?

Dairy _____
Chicken _____
Other _____

7) Within your agriculture operation, do you see a trend away from the use of manure?

Yes _____
No _____

Manure Management (continued)

8) How much, if at all, has manure degraded surface water quality in your area?

A lot _____
A little _____
None _____
Unknown _____

9) How close are surface water ways (creeks, drains, irrigation ditches or canals, etc) to the fields where you apply manure?

Adjacent _____
Very close (< 100 ft) _____
Close (< 300 ft) _____
Distant (> 300 ft) _____

Continuing Education

1) Have you read the Stewardship Bulletin "Orchard Practices for Protecting Surface Water"?

Yes _____

No _____

2) Is the Stewardship Bulletin "Orchard Practices for Protecting Surface Water" available to handlers and equipment operators at the application site during all application activities?

Yes _____

No _____

3) Which of the following management practices (sometimes referred to as "Best Management Practices" or "BMPs") you most frequently implement to protect surface water quality? (Check all that apply)

Soil Nutrient Analysis _____

Nutrient Management Plan _____

Vegetated Ditches / Grass Swales _____

Agronomist's Advice _____

Commodity-Specific Training Sessions _____

CCA Fertilizer Recommendation _____

Tailwater Return System _____

PCA Recommendation _____

Sprayer Calibration _____

Laser Leveling _____

4) If you are not already implementing the "BMPs" listed in question #9 above that are applicable to your operation, why not?

Convinced it will not work _____

Lack of available equipment _____

Cost of implementation _____

Lack of knowledge (for example, engineering) _____

Not applicable to my situation _____

Other _____

5) Are you interested in participating in a BMP effectiveness study if your expenses are covered?

Yes _____

No _____

6) Are you interested in receiving a free on-site consultation to identify potential BMPs that might be useful for your operation?

Yes _____

No _____

Continuing Education (continued)

Have you attended or completed the following?

7) NRCS, UCCE, or other Farm Water Quality training

Yes _____
No _____
Completed _____

8) NRCS or UCCE Farm Water Quality Plan

Yes _____
No _____
Completed _____

9) Erosion control training

Yes _____
No _____
Completed _____

10) Irrigation management training

Yes _____
No _____
Completed _____

11) Pest management training

Yes _____
No _____
Completed _____

12) Other training (identify)

ATTACHMENT D

Arc View Layer Key

Layers in the Walker Creek ArcView Map

NovDec2007 – contains sites that applied pesticides between November 19 and December 19, 2007. This was based upon a request by the Colusa Glenn sub-watershed due to an aquatic toxicity during the storm season sample taken in December.

Glyphosate2007 – contains sites that applied glyphosate in 2007. Used for demonstration of how this program can be used to target particular types of growers for outreach purposes.

ChlorpyrifosJuly_Sept_2007 – contains sites that applied chlorpyrifos between July 19 and September 19, 2007. This was based upon a request from the Colusa Glenn sub-watershed because of 2 consecutive exceedances of chlorpyrifos.

PLS_WC – contains Section, Township, and Range information in the Walker Creek watershed area.

Alfalfa – contains all alfalfa fields located within the Walker Creek watershed. Used for demonstration of how this program can be used to target particular types of growers for outreach purposes.

monitoring_points – contains sampling locations.

Walker Creek Watershed – contains the boundary to the Walker Creek watershed.

Walker_Creek – contains an outline of Walker Creek, North Fork of Walker Creek and South Fork of Walker Creek.

taxparcel selection – contains boundaries of the tax parcels located within the Walker Creek watershed.

field_survey – contains all fields surveyed for the BMP evaluation.

Not_surveyed – contains all fields not surveyed in the BMP evaluation. This could be because the collective field size for that grower was less than 10 acres or because the field was not accessible.

Non-Attributed – contains all areas of the watershed that the county does not have a pesticide use permit. These areas could be rangeland, urban areas, habitat, organic fields, etc. Surveys were not performed in these areas.

Organic_fields – contains sites that are organic according to the county's organic registration information. This helped staff determine where there were gaps in the survey information.

nonattparcels – contains the parcel layer cut to match the Non-Attributed layer.

Streams – contains stream information for Glenn County. This layer was used to cut the Walker Creek layer.

Roads – contains Glenn County roads.

pu_request_april – contains sites that applied any pesticide for 30 days prior to the sampling event on April 17, 2007 within the watershed from County Road 33 to the sampling location on County Road 48.

Fields selection – contains all sites in the permitting program utilized in Glenn County. This gave staff a basis of fields to be surveyed and growers to be contacted.

Topo – contains topography layers for the Walker Creek area.

Sid – contains the image layers for the Walker Creek area.

Mosaic – contains black and white images for Glenn County.